AN 1994:593371 CAPLUS
DN 121:193371
TI Internal-oxidized silver-tin-indium (Ag-Sn-In) alloy electric contact material
IN Tanaka, Yasukazu; Iida, Shoji; Tanaka, Yasufumi
PA Chugai Electric Ind Co Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 3 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06136472	A2	19940517	JP 1992-324578	19921021
	JP 3245690	B2	20020115		
PRAI	JP 1992-324578		19921021		

AB The elec. contact material is obtained by internal oxidizing a Ag alloy containing Sn 3-15, In 0.1-7, Tl 0.1-7, and optionally Fe, Co, and/or Ni 0.001-1 weight%. The material showed stable contact resistance.

FULL CONTENTS

[Claim(s)]
[Claim 1] The internal oxidation electrical contact material of the Ag-Sn-In system alloy which carried out internal oxidation of the alloy of Remainder Ag to 3 to 15weight % of Sn, 0.1 to 7weight % of In, and 0.1 to 7weight % of Tl.
[Claim 2] The internal oxidation electrical contact material of the Ag-Sn-In system alloy which carried out internal oxidation of the alloy of Remainder Ag for 1 or the plurality of Fe of 3 to 15weight % of Sn, 0.1 to 7weight % of In, 0.1 to 7weight % of Tl, and Fe group element metal, Co, and nickel to 0.001 to 1 weight %.

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the charge of electrical-contacts lumber which can be widely used for electrical equipments, such as a switch, and a breaker, a connector, especially an Ag-Sn-In system internal oxidation electrical contact material.
[0002]
[Description of the Prior Art] As this kind of an electrical contact material, what carried out internal oxidation of the Ag-Cd alloy was developed first. However, to avoid the activity of Cd for prevention of pollution is desired, and what carried out internal oxidation of the Ag-Sn alloy is used widely recently. It is very difficult to distribute uniformly and to carry out internal oxidation of the Sn in an Ag alloy, for this reason, In is added into an Ag-Sn alloy, and the electrical contact material which carried out internal oxidation of this Ag-Sn-In system alloy is used.

[0003] Even if the electrical contact material which carried out internal oxidation of this Ag-Sn-In system alloy is excellent in many characteristics as electrical contacts and surpasses an Ag-Cd oxide electrical contact material, it is not inferior, but in respect of the stability of contact resistance, amelioration of one step is just going to be expected now.

[0004]

[Problem(s) to be Solved by the Invention] Then, this invention is made in an activity life for the purpose of offering the internal oxidation electrical contact material of the Ag-Sn-In system alloy which has the contact resistance which carried out termination stability.

[0005]

[Means for Solving the Problem] In this invention, 0.1 to 7weight % of Tl (thallium) was added to the Ag alloy containing 3 to 15weight % of Sn, and 0.1 to 7weight % of In, and internal oxidation of this alloy was carried out. Tl did not have the public nuisance nature like Cd, but it was found out that internal oxidation of the Sn can be far carried out in Ag uniformly rather than the case where only In is moreover used.

[0006] That is, when Tl is used with In to the deoxidation ghost layer called "become it dry" on the surface of an alloy being accepted when only In is used, this inconvenience does not arise. Moreover, when Tl was used with In to Ag grain boundary being accepted during an alloy organization when only In is used, most Ag grain boundaries were not accepted but it was accepted that Sn oxide carries out deposit oxidation uniformly over an alloy at large.

[0007] Moreover, since Tl oxide has a fusing point and a vapor point similar to Cd oxide, as for the Ag-Sn oxide electrical contact material having contained Tl oxide, self-consecration of the contact side is carried out like the case of an Ag-Cd oxide contact material. This contributes to stabilization of the contact resistance of a point of contact greatly.

[0008] In order for 3weight % of the lower limit of Sn used for the Ag alloy of this invention to make fire resistance the contact material obtained, it is a complement, and 15weight % of that ceiling value is an amount not to spoil the workability of the contact material obtained extremely.

[0009] In order to support the internal oxidation of Sn, the amount of In is at least 0.1 weight %, and if the amount exceeds 7 weight %, it will make an ingredient weak. Moreover, in order for 0.1weight % of the lower limit of Tl to promote the internal oxidation in the inside of Ag of the above-mentioned Sn, it is the minimum amount for guaranteeing the self-consecration nature of a contact side, and 7weight % of the ceiling value is an amount for leaving workability to the contact material obtained. In addition, there are Sn, above-mentioned In, and above-mentioned Tl of weight % within limits which may dissolve with Ag, respectively.

[0010] Moreover, you may make 1 or the plurality of Fe of Fe group element metal, Co, and nickel contain 0.001 to 1weight % further in an Ag alloy for adjustment of the crystalline structure of an alloy as carried out conventionally.

[0011]

[Example]

(1) 10 weight % of 2 weight % of - with a 0.2 weight % of 2 weight % of 3 weight % of.- with a 1

weight % of 3 weight % of - with an Ag-Sn of 6 weight % In(s)-Tl(2) Ag-Sn of 6 weight % In(s)-Tl-nickel(3) Ag-Sn of 6 weight % In(s)(4) Ag-Cd [0012] The alloy (3) for the alloy (1) of above-mentioned this invention, (2), and comparison and a formed part of (4) were dissolved with the high frequency fusion furnace, respectively, and it was made the ingot. After carrying out the machine cut and carrying out peeling of the surface of this ingot, the pure Ag plate was stuck to this field by which peeling was carried out by pressure with hot press. This was annealed at about 600 degrees C for 30% of every rolling rate, and it rolled in tabular [of 2mm]. Internal oxidation of this plate was carried out in 700 degrees C and the oxygen environment of 7atm.

[0013] This plate was pierced to the punch of the diameter of 6mm, and the contact sample (1) respectively corresponding to the above-mentioned alloy (1) with an outside diameter [of 6mm] x thickness of 2mm, (2), (3), and (4), (2), (3), and (4) were obtained.

[0014] In order to measure each contact resistance (momega), these samples were attached to the magnet switch and tested on condition of following based on JIS-AC3. In addition, measured value measures and obtains the power-source side and load ******** in momega meter.

** Pressure: AC 200V (charge) 35V (cutoff)

** Style: 150A (charge) 25A (cutoff)

load reactor: -- pf=0.35 ** degree: -- a part for 60 times/-- time number: -- 2,000,000 times contact-pressure: -- 100g of the result was as in Table 1.

[0015]

[Table 1]

下記回数終了時の接触抵抗（mΩ）

	初期	20万回	40万回	80万回	80万回	100万回	120万回	140万回	180万回	180万回	200万回
試料(1)	23	25	27	25	29	25	26	28	26	30	28
試料(2)	23	26	27	25	29	25	26	28	26	30	28
試料(3)	30	60	55	40	60	52	54	30	60	35	50
試料(4)	10	20	18	溶着	-	-	-	-	-	-	-

[0016]

[Effect of the Invention] As for a passage clear from the above-mentioned test result, even if it compares with an excellent ordinary contact material the contact material which becomes this invention, the prominent effect that contact resistance is extremely stable is accepted.

[Translation done.]